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PYLE & PIONTEK

ATTN: THOMAS R. VIGIL

221 N LASALLE STREET , ROOM 2036

ROOM 2036

CHICAGO, IL 60601

EXAMINER

ROBINSON, LAUREN E

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/554,167	Applicant(s) GAMBARELLI ET AL.	
	Examiner LAUREN ROBINSON	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 33-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Rohrbaugh et al. (US Pub. No. 2002/0045010).

Regarding claims 33-34: Rohrbaugh et. al. teach materials for coating, methods and articles of manufacture comprising a nanoparticle system to create multiuse benefits to modified hard surfaces (abstract). Rohrbaugh et. al. teach that the taught coating can be used to improve the surfaces of ceramic, stone (0010), porcelain dishware, stoneware, hard paste (known as porcelain) (0040) stone tiles (0231).

Also, the coating is comprised of TiO₂ and can be used in the rutile, anatase and/or amorphous state (0065) and is used to give photocatalytic properties to degrade organic pollutants (0065) (**Claims 33-34**).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

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subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 22-32 and 35-42 are rejected under 35 U.S.C. 103(a) as being obvious over Rohrbaugh et. al. (US Publication No. 2002/0045010) in view of Kuchinski et. al. (US Patent No. 6001494), Boire (US Patent No. 6103363), Hanson (US Patent No. 4267209), Tsujimichi et. al. (US Publication No. 2001/0036897), and Kamen et. al. (Patent No. 5585153).

Regarding claim 22 : Rohrbaugh et. al. teach materials for coating, methods and articles of manufacture comprising a nanoparticle system to create multiuse benefits to modified hard surfaces (abstract). The benefits of manufacturing the articles according to the present reference include providing the properties of soil removal, anti-soil deposition, self-cleaning, enhanced gloss (must be present to be enhanced), enhanced color, and the release of actives (abstract) of ceramic, stone (0010), porcelain dishware, stoneware, hard paste (known as porcelain) (0040) and stone tiles (0231).

Rohrbaugh teach the use of 10 to 50 % metal oxides in a glaze (0068, 0104). The metal oxide may be photoactive and photocatalytic nano particles of TiO₂ (0007-0008). Silica and zeolites can also be used (0053-0064, 0195, 0208).

The reference also teaches that the covering can be provided with nano sized pores, which can be converted to micron size)(channels) (0068) and that the covering can be subjected to a drying step using any technology known for accelerating drying

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and curing such as forced (insufflation) air drying during the application of heat at elevated temperatures (0234).

However, they *are silent regarding*

- *the paste being silk-screen,*
- *an engobe (slip) being present*
- *materials present that absorb NO_x*
- *channels present to increase permeability*
- *thickness of the coating being uneven and designed to increase exchange surface, and*
- *firing at 1200°C.*

Consider the paste being silk-screen

Hanson teaches a method for decorating a surface of a ceramic article by applying a medium comprising ceramic and inorganic material and a frit material (Pg. 4, Col. 1, Par. 1). The ceramic bodies referred to in this reference are wall tile, counter tile, and floor tile (Pg. 1, Col. 1, Par. 1). The medium and frit that is applied is to decorate the tile and it is disclosed that this can be done by silk screening with a roller (Pg. 1, Col. 1, Par. 2). The method of silk screening in this reference states that the article is moved along a path and a selected design is applied by means of a ceramic and inorganic material (silk-screen paste) (Pg. 1, Col. 2, Par. 1). A granule composition is made by mixing selected frits and silica to form a powder like mixture (claim 9) and then mixed with a glaze (Pg. 1, Col. 2, Par. 4). The granules are then flowed to the ceramic composition on the articles (Pg. 1, Col. 2, Par. 1) and a glaze is placed on top (Pg. 4,

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Col. 2, Par. 5). The article is then fired at temperatures above 800°F (Pg. 1, Col. 2, Par. 4). In the disclosure it is stated that the surfaces that includes the said glaze covering after firing may be of any suitable color (Pg. 4, Col. 1, Par. 5).

Hanson and Rohrbaugh et al. disclose analogous inventions related to a method for coating a ceramic tile article using frit (with metal oxides) and granular material with a paste and the paste in both references enhance color and gloss on the surface.

While Rohrbaugh et. al. is silent with regard to a silk-screen paste being present with the gloss (glaze) and titanium dioxide coating, Hanson teaching that a ceramic (which may be porcelain) and an inorganic material (which may be titanium dioxide), applied by silk screening and such a process allows for enhanced color and surface characteristics, which is desirable. It would have been obvious to one of ordinary skill in the art to use the method taught by Hanson, which forms a silk-screen paste, to apply the titania glaze materials taught by Rohrbaugh et al. in order to obtain a surface with enhanced color and surface characteristics.

Consider an engobe finish being used and the coating being fired at 1200
degrees Celsius

Kuchinski et. al. teach a metal-ceramic composite coating providing products with anti-corrosion enamel wherein the coating is considered a frit that can be made of silica, an additional metal oxide, etc.(abstract). The reference teaches that titanium dioxide can be present and the titanium dioxide can be present in the coating in variable percentages composition (Pg. 2, Col. 1, Par. 3) and that the particles within the coating

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are crushed and wet (water) milled with clay forming a slip (engobe) with a disk booth and then metal (Pg. 1, Col. 2, Par. 1) Also, the reference teaches throughout that a coating made with the materials therein and produced by the taught methods therein obtain a coating of enhanced color, gloss, increase refractive index of UV and abate pollutants (such as oxidizing).

Further, they teach that the final coating is dried and fired at a temperature in between 500 and 1000°C (Pg. 2, Col. 2, Par. 3) and they illustrate that firing temperatures are known to be result effective variables as temperatures can be varied to optimize performance/cost tradeoffs (Pg. 3, Col. 2, Par. 7).

Rohrbaugh et al. and Kuchinski disclose analogous inventions related to an anti-pollutant coating with enhanced color, etc. surface properties. While Rohrbaugh et. al. are silent with regard to an engobe finish, it is the examiner's position that one would recognize from Kuchinski that it would be advantageous to use the materials (ie: engobe) and treat the coating similarly to Kuchinski in order to provide for enhanced color, etc.. Also, that the firing temperature is a result effective variable and the temperature can be varied to any temperature to obtain performance properties such as hardness, etc. or desirable cost characteristics, and through routine experimentation, desired results can be obtained.

As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Rohrbaugh to include that an engobe finish can be obtained by the method of Kuchinski to obtain an enhanced surface appearance and that the coating can be fired to any desired temperature including 1200 degrees Celsius

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depending on desired performance of the coating, such as hardness, etc. which is known in the art.

Consider micro channels in the thickness direction to increase permeability of water and micro uneven areas designed to increase exchange surface

Boire teaches a ceramic-based substrate (Pg. 4, Col. 2, Par. 6) with a photocatalytic coating containing titanium dioxide (abstract) and can be used for materials such as tile, and architectural materials (Pg. 4, Col. 1, Par. 1). The reference teaches that the coating gives the substrate dirt repellent, anti-ultraviolet, antimicrobial, etc. properties (Pg. 4, Col. 1, Par. 2). The coating upon the addition is made to have a degree of roughness which enhances photocatalytic activity (exchange) (Pg. 2, Col. 2, Par. 3) and that there is induced porosity in at least a portion of the coating that enhances wetting properties (permeability) (Pg. 2, Col. 2, Par. 3-4) and the covering has a thickness that varies from 5nm to 1 micron (Pg. 3, Col. 1, Par. 2) corresponding to micro uneven areas.

Boire and Rohrbaugh disclose analogous inventions regarding a coating for tile which provides anti polluting properties. Since Boire illustrates that a coating having micro uneven areas with pores in the micro thickness (micro channels) wherein both provide the coating with enhanced properties that would be desired in Rohrbaugh, it is the examiner's position that one of ordinary skill in the art would find the characteristics and methods of obtaining said characteristics of Boire to be obvious and advantageous in Rohrbaugh. As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Rohrbaugh to include the uneven and porosity

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characteristics of Boire in order to obtain enhance antipollution as well as wettability (water permeation) of said coating. Also, since it is discussed above that the coating is a silk screened paste brushed on the tile one would know that the characteristics would be obtained through a silk screening process.

Consider materials present to absorb NO_x

Tsujimichi et. al. teach a formulation comprising titanium dioxide as a photocatalyst and an amphoteric metal oxide or a base metal oxide. When a nitrogen oxide comes into contact with titanium dioxide upon light exposure (photocatalytic activity), the carbon monoxide is oxidized to nitrogen dioxide gas by hydroxyl radicals from the active oxygen species produced by titanium dioxide (abstract). The said nitrogen dioxide is chemically bonded to the oxygen atom and held on the metal oxide to be kept close to the titanium dioxide as the photocatalyst (abstract). This application is used for air purification on the surface where nitrogen oxides in the air are then oxidized with the oxygen to form nitric acid (Pg. 1, Col. 1, Par. 1) when water is on the surface. The reference discloses that the formulation composition is placed on a ceramic substrate such as tile and bonded by a binder (paste) and the metal oxide can be magnesium oxide (claims 3, 4, and 10 and Pg. 26, Col. 1, Par. 5). This teaching of holding the NO_x within the coating corresponds to NO_x being absorbed.

Rohrbaugh and Tsujimichi et. al. disclose analogous art related to a coating comprising titanium dioxide with pores wherein the coating is provided with anti pollution properties. Since Tsujimichi et al. illustrates that further antimicrobial properties of the surface can be obtained by purifying the air thereon through the absorption of NO_x, it is

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the examiner's position that one would find it obvious to use the materials of Tsujimichi in Rohrbaugh to produce the same effects as they would be desired. As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Rohrbaugh to include the materials and characteristics (adding magnesium oxide with titanium oxide) of Tsujimichi in order to enhance the surface purification properties **(Claim 22)**.

Regarding claims 23-24: As discussed, Rohrbaugh teaches that 10 to 50% metal oxide, which they teach to be titania, can be present **(Claim 23)** and that titania can have the anatase form **(Claim 24)**.

Regarding claims 25: As discussed, Rohrbaugh teaches the applicants' invention of claim 22 along with titanium dioxide increase refraction of UV. However, the reference *does not specifically teach the materials increasing the refraction of light being a white pigment and silica*.

While this limitation is not specifically disclosed, as discussed, Rohrbaugh et. al. teaches that silica is present with the titania. The examiner notes that due to it being known that titania is white and that both titania and silica are together, it is the examiner's position that one would know that the combination would provide the same effects as claimed along with silica being with a white pigment. As such, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Rohrbaugh et. al.'s teaching to include that the above silica materials and titanium dioxide are comprised of white pigments that increase solar light refraction **(Claim 25)**.

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Regarding claim 26: As discussed, Rohrbaugh et al. was modified to include the method of obtaining a coating comprising an engobe in the manner taught by Kuchinski which uses a disk booth. Also, it was discussed that the coating can be brushed (painted) on the tile which lacks the use of air which one would know uses high pressure (**Claim 26**).

Regarding claim 27: Rohrbaugh discloses that the silica and the titania which as discussed increase the refraction of solar light are applied in one coating to a tile using silk screening as taught in Hanson. The examiner notes that Hanson teaches that silk screening paste is performed by applying the glaze directly to the tile with rollers. However, the reference is still silent regarding the rollers being silicon rollers, but they are silent with regard to the roller being silicon rollers.

Kamen et. al. teach a method for applying a decorative coating (abstract) to a ceramic article (Pg. 1, Col. 1, Par. 4). This reference also discloses that roll-on methods can be performed using a silicon rubber roller (Col. 1, lines 15-30) or a silk screen method (Col. 2, lines 15-30) using rollers made by Silicon Limited which are known to apply coatings in a continuous process (Col. 1, lines 15-30), applying a sufficient amount of pressure and therefore, and makes the process simple as it eliminates the need for kilns, etc. to set coatings (Col. 3, lines 1-30). Since Kamen et. al. teach a method for placing a decorative coating onto a ceramic substrate by using a silicon roller and silk screen process, one of ordinary skill in the art would recognize that this is related to the process taught in Rohrbaugh which includes silk screening using a roller.

However, one would also see from Kamen et al. that silicone rollers are preferred as it allows for a continuous application process, providing efficient pressure and eliminates the need for kilns, etc. to set the decoration and therefore, making the process more simple. As such, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Rohrbaugh to include that the roller can be a silicone roller according to Kamen in order to provide efficient pressure, continuous application and provide for a more simple process. Also, since one would know that the final coating will have a desired final thickness, one would find it inherent that the silicon rollers and silk screen process provided such thickness **(Claim 27)**.

Regarding claim 28: As discussed Rohrbaugh, now teaches that magnesium oxide and engobe according to Kuchinski can be used in the coating. The examiner notes that Kuchinski teaches that the magnesium oxide is actually formed in the coating by passing the metal (Pg. 3, Col. 2, Par. 7) powder through a 325 mesh screen and the powder that does not remain on the screen can be added to the slip (engobe) (Pg. 1, Col. 2, Par. 1). Since it was discussed that the modification of Rohrbaugh would include adding the engobe and magnesium oxide in the manner as taught in Kuchinski, the examiner notes that the above teaching would now be included.

Also, the examiner notes that according to US Patent No. 3,865,778, magnesium oxide passing through a 300-325 mesh screen is known as magalite D. Therefore, the above teaching would have magalite within the engobe.

Further, Rohrbaugh as discussed teaches that zeolite is used within the coating. Since zeolite is in the coating and magalite D is in the engobe as modified within

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Rohrbaugh, then the teaching corresponds to applicants' claim 28 as Kuchinski also teaches that the magalite absorbs NO_x and since the two materials in the reference are the same as the ones in the claim, one would expect that the two material combination to have the same effect of absorbing the NO_x as claimed (**Claim 28**).

Regarding claim 29: Also, as discussed, the materials absorbing the NO_x is used in the coating and as discussed above from Hanson, the coating is applied by silk screening machines and that the silicone rollers of Kamen would provide for a simpler and more efficient process. Also, one would know that if the coating is applied by such means, regardless of the thickness obtained, the process with the rollers would be providing the final desired thickness (**Claim 29**).

Regarding claims 30-31: Also, as discussed since it was obvious to use the silk screening machine and silicone rollers to apply the coating, and provide the uneven and micro channel porosity within the coating as discussed above, one would recognize that since the coating is applied within the silicon roller that the silicon roller would be obtaining the desired thickness and coating surface properties. Therefore, one would know that since it was found obvious to obtain uneven micro thickness as well as micro channels that the silicon rollers would obviously have to obtain such properties and one would recognize that this could be done by placement of the rollers, speed at which the rollers pass, pressure provided in certain areas of coating, etc.. As such, it would have been obvious to one of ordinary skill in the art to modify Rohrbaugh to include that the rollers applying the coating can be made to provide the surface characteristics of

uneven areas and porosity in order to increase water permeability and exchange surface of the coating **(Claims 30-31)**.

Regarding claim 32: As discussed, it was determined obvious that Rohrbaugh can include silicone rollers to apply the coatings comprising the materials that increase solar refraction and that absorb NO_x as well as to use the rollers in providing the uneven areas and micro pores. However, the reference does not specifically disclose the use of four rollers wherein each one applies one of the above materials or characteristics to the coating.

Although the reference is silent, the examiner notes that it would have been obvious to one of ordinary skill to use four rollers as this would provide for a more clean application. For example, if one roller was used to handle all of the above materials and characteristics, one would recognize that there is an increase chance of transferring one material in an undesired location when applying another. As such, it is the examiner's position that one would have found it obvious to one of ordinary skill in the art at the time of invention to use four synchronized silicone rollers to carry out the four processes as claimed in order to enhance control of coating manufacture **(Claim 32)**.

Regarding claims 35-37: As discussed, the coated tile of Rohrbaugh was modified to include that the coating can be obtained by modifying the firing phase to 1200 degrees Celsius **(Claim 35)**. Also, Rohrbaugh discloses that the coating can be applied, it can be dried with insufflation as discussed which now includes firing at 1200 degrees Celsius, and then the steps can be repeated (0022). Therefore, the final TiO₂ coating can be

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applied after firing of the first application is complete (**Claim 36**) and the coated tile can be re-fired (**Claim 37**).

Regarding claims 38 The examiner notes the claims 38-42 are product by process claims and according to the MPEP, although the product might be limited to and defined by the process, the determination of patentability is on the product itself not its method of production.

Therefore, in claim 38, the materials needed are an engobe with 25% TiO₂, a calcic glaze comprising 25% TiO₂ and a 100% TiO₂ paste. The examiner notes that Rohrbaugh teaches that the coatings of TiO₂ can be comprised of 10 to 50% TiO₂ or even 100% TiO₂ (0068, 0082) and coatings can be applied repeatedly as discussed. Therefore, one would recognize that three coatings of TiO₂ can be present with the teaching of Rohrbaugh with one being 25% TiO₂, the second being 25% TiO₂ or 100% TiO₂ and the third being 100% TiO₂.

Also, it was found obvious that the coating can be comprised of an engobe applied by a disk booth and therefore, one would recognize that any of the layers including the first can be made with the engobe. Further, the reference teaches that a TiO₂ coating can be a glaze of calcic (0094), zinc (0064), alkaline silica borne materials, and since it was discussed that the materials of Kuchinski can be used in the coatings, Kuchinski teaches materials comprising mixtures of silica, boron and zirconium. Therefore, one would realize that during manufacture, one would know that a coating of 25% TiO₂ in a calcic glaze, a zinc glaze, or an alkaline silica-boron-zirconium glaze, could be added during a repeating step such as in the second coating.

Even further, it was determined obvious that the coatings could be applied with a brush without air at high pressure and silk screening. Further, since it was found obvious to use the material of Kuchinski, Kuchinski teaches screening with a mixture of iron and molybdate. Therefore, through the production of a ceramic tile one would know that each coating as claimed can be produced using the steps as claimed (**Claims 38-42**).

Response to Arguments

Applicant's arguments filed 22 July 2008 have been fully considered but they are not persuasive.

Applicants' argue that it appears that the examiner used hindsight reasoning in the previous action. However, the applicants have not pointed out specific errors therein and the examiner notes that hindsight was not used but rather, the present action was illustrating that the references disclosed steps which each provided a particular characteristic that would be found desirable in Rohrbaugh.

For purposes of clarification to illustrate the examiner's reasoning within the previous action, the following action has been amended for clarification purposes only and separating the claims of interests and in doing so, neither the rejections nor reasoning have been changed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAUREN ROBINSON whose telephone number is (571)270-3474. The examiner can normally be reached on Monday to Thursday 6am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-2721284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lauren E. T. Robinson
Examiner
AU 1794

/LAUREN ROBINSON/
Examiner, Art Unit 1794

/Carol Chaney/
Supervisory Patent Examiner, Art Unit 1794